Research Paper

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MSPEUX – Mobile Search Personalization by Enhanced User Experience

Engineering

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ABSTRACT

As the Web keeps expanding, the number of pages indexed in a search engine increases correspondingly. With such a large volume of data, finding relevant information satisfying user needs based on simple search queries becomes an increasingly difficult task. When it comes to mobile search the interactions between the users and search engines are limited by the small form factors of the mobile devices. As a result, mobile users tend to submit shorter, hence more ambiguous queries compared to their web search counterparts. In order to return highly relevant results to the users, mobile search engines must be able to profile the users' interests and personalize the search results according to the users' profiles. EUXMSP-Enhanced User Experience For Mobile Search Personalization captures the users' preferences in the form of concepts by mining their clickthrough data. Based on the client-server model, the client collects and stores locally the click through data to protect privacy, whereas heavy tasks such as concept extraction, training, and reranking are performed at the server. The proposed system will identify the client behaviours thoroughly to enhance the search efficiency. Site analysis will be carried out by EUXMSP to improve the personalized search results.

Introduction

Personalized search is an important means to improve the retrieval effectiveness of a search engine, since user queries are normally short and ambiguous. The mobile search personalization application captures the users' preferences in the form of concepts by mining their clickthrough [9][11] data.

The search application classifies these concepts into content concepts and location concepts [11]. Based on the client-server model, the client collects and stores

locally the click through [9][11] data to protect privacy, whereas heavy tasks such as concept extraction, training, and reranking are performed at the server.

The proposed system will identify the client behaviours thoroughly to enhance the search efficiency. The Site analysis of the perspective users will be carried out to further improve the accuracy of future search results. In mobile search the interactions between the users and search engines are limited by the small form factors of the mobile devices so the mobile users are tend to submit shorter and hence more ambiguous queries as compared to their web search counterparts.

Current web search engines lack user adaption, retrieve results based on web popularity rather than user's interests also most users typically view only the first few pages of search results .The problem is that relevant results beyond first few pages have a much lower chance of being visited.

In order to overcome the above mentioned difficulties, there is a need for profiling the users' interests and personalize the search results according to the users' profiles to achieve the desired mobile search effectiveness.

Personalization approaches aim to tailor search results to individuals based on knowledge of their interests, identify relevant documents and put them on top of the result list and filter irrelevant search results.

The EUXMSP smart app is prototyped on google android platform. Android is a software stack for mobile devices that includes an operating system, middleware and key applications. Google Inc. purchased the initial developer of the software, Android Inc., in 2005.

Android's mobile operating system is based on the Linux kernel. Google and other members of the Open Handset Alliance collaborated on Android's development and release. The Android Open Source Project (AOSP) is tasked with the maintenance and further development of Android. The Android operating system is the world's best-selling Smartphone platform.

The Android SDK provides the tools and APIs necessary to begin developing applications Android platform using the Java programming language. Android has a large community of developers writing applications ("apps") that extend the functionality of the devices. Android powers more than a billion phones and tablets around the world [12].

The rest of the paper will be organised as follows: In section 2, we see about the related works of the paper. In section 3, we discuss about the proposed method. In section 4 will discuss about the EUXMSP implementation in brief and the conclusion of my paper is in section 5. References are provided in section 6 of this paper.

Related Works

In this section, we will see some of the related works which provides various techniques and concepts which form the building blocks for the EUXMSP smart application.

S.Yokoji proposed a location based search engine which poses a location-based search system for web documents on the Internet. This system can find web documents based on the distance between locations that are described in web documents and a location specified by a user. It consists of three modules. (a) A robot that gathers documents from the Internet, (b) a parser that extracts address strings from web documents and associates latitude-longitude information to the original document and (c) a retrieval module.

Phong Lee, Mark ClayPool & David Brown [2] developed a web browser (Curious Browser) to record user actions (implicit ratings) and explicit ratings for each page visited. The Curious Browser asks for explicit ratings whenever the user changes Web pages.

Qingzhao Tan, Xiaoyong Chai,Wilfred Ng & Dik-Lun Lee[3] Proposed a new algorithm, Ranking SVM in a Co-training framework(RSCF).

Qingquing Gan, Josh Attenberg, Alexander Markowetz and Torsten Suel[4] published a paper on geographic search queries. They provided the Investigation of geographic queries in details and proposed a classifier for classifying geo and non geo queries.

Alexander Markowetz, Yen-YuChen, Torsten Suel, Xiaohui Long and Bernard Seeger Developed a prototype[5] which performs extraction of geographic features from crawled data ,which are mapped to coordinates and aggregated across link and site structure. This assigns a geographic foot print to each page .Footprint data is then integrated in to a query processor.

Yabo Xu BenuZhang & Ke Wang[6] proposed Parameters for specifying privacy requirements. .This will help the user to choose the content and degree of detail of the profile information that is exposed to the search engine. Yen-YuChen Torsten Suel & Alexander Markowtz [7] proposed several algorithms for efficient query processing in geographic search engines. A query is assigned with a query foot print which specifies the geographical area of interest to the user.

Wilfred Ng, L. Deng, and D.L. Lee [8] proposed a method to combine a spying technique together with a novel voting procedure to determine user preferences. Thorsten Joachims[9] proposed a Support Vector Machine (SVM) approach, this paper presents a method for learning retrieval functions. This idea of SVM approach [9] is used by the EUXMSP smart application for ranking of the user preferences captured.

Mario Arias, Jose M .Cantera & Jesus Vegas[10] proposed a thesaurus-based semantic context aware auto completion mechanism. This approach provides some insight in to enhancing the user experience of the search personalization.

This section presents some of the most recent research works related to this research area and possible solutions suggested by most eminent authors.

PROPOSED WORK

EUXMSP application utilizes many of the ideas and techniques proposed by the previous authors for preference mining. Behaviours of the user are not thoroughly identified in the existing works. Identifying the client behaviours without using any explicit surveys or behind the screen preference minining is the key functionality of this EUXMSP application.

Client behaviours will be identified thoroughly to enhance the search efficiency. Time spent on the sites needs to be measured which can be used for improving the search personalization effectiveness. A browser that inherits the class to capture several events was deployed and which helps to capture the time spent on each page by the user to improve the accuracy of users search result.

Enhanced User Experience

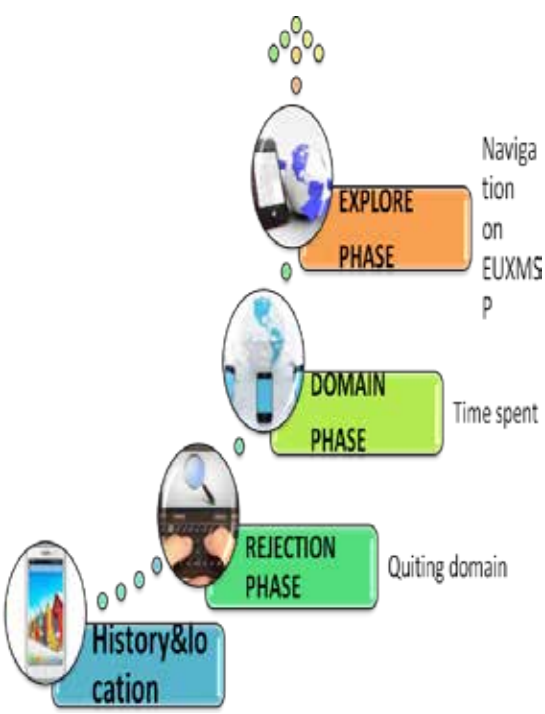

Figure 1-EUXMSP-System overview

EUXMSP IMPLEMENTATION

A realistic design for EUXMSP was implemented by adopting the meta search approach which replies on one of the commercial search engines, such as Google to perform an actual search. The client is responsible for receiving the user's requests, submitting the requests to the EUXMSP server, displaying the returned results, and collecting his/her clickthroughs[9][11] in order to derive his/her personal preferences. The EUXMSP server, on the other hand, is responsible for handling heavy tasks such as forwarding the requests to a commercial search engine, as well as training and reranking of search results before they are returned to the client.

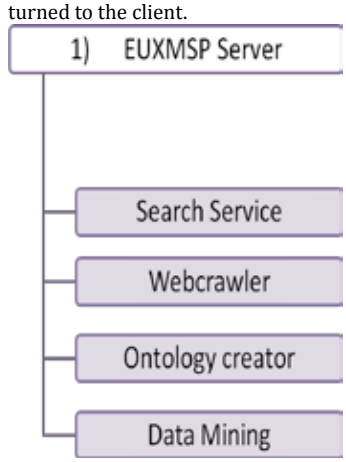

Fig.2-EUXMSP Server

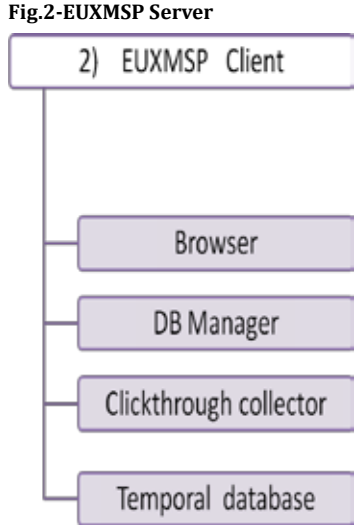

Fig.3-EUXMSP Client

The user profiles for specific users are stored on the EUXMSP clients, thus preserving privacy to the users.

When a user submits a query on the PMSE client, the query together with the feature vectors containing the user's content and location preferences are forwarded to the PMSE server, which in turn obtains the search results from the backend search engine (i.e., Google). The server is used to perform ontology extraction for its speed. The feature vectors from the client are then used in RSVM training to obtain a content weight vector and a location weight vector, representing the user interests based on the user's content and location preferences for the reranking. Again, the training process is performed on the server for its speed. The search results RSVM training. Finally, the reranked results are used for the personalization of future queries are returned to the client.

The ontologies returned from the EUXMSP server contain the concept space that models the relationships between the concepts extracted from the search results. . When the user clicks on a search result, the click through data together with the as-

sociated content and location concepts are stored in the click through database on the client. The click throughs are stored on the EUXMSP clients, so the PMSE server does not know the exact set of documents that the user has clicked on.

The EUXMSP smart application has been prototyped with EUXMSP clients on the Google Android platform and the EUXMSP server on a PC server to validate the proposed ideas.

Conclusion

In this research work, a personalized mobile search application with enhanced user experience is introduced. EUXMSP-Enhanced User Experience For Mobile Search Personalization is expected to extract and learn a user's content and location preferences based on the user's click through.

The system will also make use of the user's GPS locations in the personalization process which will help to deliver more precise results for the user.

The system will allow the user to control the privacy exposure based on the requirements. This will help to maintain the privacy if the user is not ready to reveal some sort of privacy information implicitly by means of click through.

The EUXMSP identifies the user behaviours thoroughly by analyzing various parameters like time spent on the web pages and number of click on each pages and so forth. This will help to further enhance the search effectiveness of the application by delivering the most accurate results to the user.

Our experimental result showed that our proposed EUXMSP improves the search personalization effectively when compared to previous methods.

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